

Worksheet: Data Storage

Use the PowerPoint Presentation (and its associated web links) to fill in responses in the yellow areas of the document. The yellow areas will automatically expand to accept longer answers.

Remember to click on “Turn In” once you are finished so it does not show up as late.

What is the difference between volatile and non-volatile data storage? Give two examples of each.

The difference between volatile and non-volatile is that volatile loses its memory when the power of the PC is cut off whereas non-volatile keeps the memory stored even when the power of the computer is cut off. An example of volatile storage is RAM and examples of non-volatiles are hard-drive, USB Sticks etc.

Does a USB stick use volatile or non-volatile storage?
How do you know?

The USB Stick uses non-volatile storage because it stores/remembers all the data and/applications after the computer is turned on.

Why is there a lawsuit over *DRAM*? (Hint: Look at the FAQ at www.themoneyismine.ca/faq)

There was a lawsuit against DRAM manufacturer because they had increased the price of the DRAM dramatically, many people argued that the price of DRAM should be fixed as DRAM is used in most in most computers, printers, personal digital assistants, graphics cards, mp3 players, video game consoles etc.

Rate the following memory types in order from fastest to slowest: RAM, cache, hard drive

The following memory type in order from fastest to slowest include:

1. Cache
2. RAM
3. Hard Drive.

Why isn't everything storage in cache memory? Why does a computer also need RAM?

Everything is not stored in cache memory because cache memory only stores data and instructions that the CPU notices is being used more often and/or more frequently. The computer needs RAM to store its Operating System when the computer is turned on and to store other running applications till the computer is powered.

Find and list examples of DRAM available for purchase? What are some important characteristics you should look for when purchasing RAM?

Some DRAM that are available for purchase include: Crucial CT2K8G4SFS824A, Patriot Viper Elite Performance, Kingston HyperX Predator DDR4 RGB.

Some important characteristics you should look for when purchasing RAM include:

- The **RAM type** that your motherboard will take. For example some motherboards can take DDR1, DDR2, DDR3 there always check which one your motherboard can support.
- The **RAM capacity** that your RAM type can take to function properly.
- The **RAM frequency** of your RAM type for example DDR1 frequency can be 100-200 MHz therefore always make sure to pick the right one for your specific RAM type.

In your answer above, why do you think the RAM is sold as a 4-pack?

(Hint: Look back at the PowerPoint presentation)

I think RAM is sold in 4 packs because some motherboard accept different types of RAM therefore is mostly sold in 4 packs so that the motherboard receives the same type for each of its slot.

List at least three (3) electronic devices in *your life* that use ROM.

(Hint: Think of devices that *do something* as soon as you boot them up.)

3 devices in my life that use ROM are CD, video game console, and floppy disk drives.

List an example of each of the following types of memory by listing its purpose, capacity, and transfer rates.

a. Hard Drive

Example: Seagate BarraCuda 1TB

Purpose: Hard drives is a secondary memory and they are used to store files for the OS, store personal information or/and softwares programs.

Capacity: The capacity of hard drives are usually 1 Terabyte.

Transfer Rates: The transfer rate of a hard drive is usually about 100-200 MB/s

b. Cache L1

Examples:

Purpose: The purpose of Cache L1 is to store the data that is used more often or/and most

frequently.

Capacity: The capacity of a Cache L1 is usually about 30,000 bytes.

Transfer Rate: As Cache L1 is the fastest memory, the transfer rate is about 4000 GB/s

c. Cache L2

Examples:

Purpose: The purpose of Cache L2 is to store the data that is not used as often as L1 and it also has a lot of capacity than L1.

Capacity: Usually the capacity of Cache L2 is 256,000 bytes or 265 KB

Transfer Rate: The transfer rate of cACHE L2 is maximum 528 MB/s.

d. DRAM

Examples : Patriot Memory DDR3

Purpose: Used to store data or code functions that computer requires in order to function properly, it usually needs to be refreshed more often than a SRAM.

Capacity: The capacity of DRAM is about 8 GB

Transfer Rate: The transfer rate of DRAM is about 6400MB/s

e. SRAM

Examples: RAM SRAM DIP-28

Purpose: Used to store data that the computer needs, and it is usually faster, more expensive than DRAM and it also doesn't need to be refreshed more often as DRAM.

Capacity: The capacity is usually about $2^m = 2,048 = 3d$ words

Transfer Rate: The transfer rate of SRAM is 4 words of data in a clock cycle.

How does cache work? How is it important to your computer system?

http://www.tutorialspoint.com/computer_fundamentals/computer_memory.htm

Cache memory is the fastest memory used by the CPU, when the CPU notices that an application, data or instruction is being used more frequently, the CPU stores that data and application in Cache memory therefore is faster to access that applications, data or instructions.

RAM

a. What is static RAM? What is dynamic RAM?

Static RAM is a faster, and it is volatile, it is also more expensive and more reliable than Dynamic-RAM.

Dynamic-RAM is slower than Static-RAM and it is volatile, it is also used in most computers and electronic devices. It needs to be refreshed more often as it will lose all its content.

b. What does DDR RAM stand for? What is it?

DDR RAM stands for "Double Data Rate" Random Access Memory. DDR RAM is the most common memory found in most computers, this memory transfers twice as much data as SDR. The frequency rate of a DDR RAM is usually about 100-200 Mhz.

c. What is VRAM?

VRAM stands for Video Random Access Memory. The VRAM are used to store image data for a computer display.

d. When do you need more RAM? Can you ever have enough?

<http://computer.howstuffworks.com/ram.htm>

2GB: Only really found in budget tablet designs. Fine for them, but you'll want more in a laptop or desktop.

4GB: Entry level memory that comes with even budget notebooks. Fine for basic Windows and Chrome OS usage.

8GB: Excellent for Windows and MacOS systems and most games. We recommend this for most people.

16GB: Ideal for professional work and more demanding games.

32GB and beyond: Enthusiasts and purpose-built workstations only.

Overall you can never have enough RAM as the more storage your RAM is the better your computer will function.

For a hard drive, research the following specifications and explain what they mean. What is the current standard for each spec?

a. Data rate

Data rate is bytes per second. It means how many bits per a certain unit of time are transferred. The current standard for data rate are about 5-40 MB/s

b. seek time

Seek time is the amount of time between the CPU request some sort of data and when the first byte of the data reaches the CPU. The current standard for seek time is about 10-20 millisecond.

c. capacity

Capacity is how many bytes something can hold. The current standard for capacity is 10-40 gigabytes in a hard disk.

d. RPM

RPM stands for resolutions per minutes, RMP is a measurement of how many resolution a computer hard drive makes per second. The higher the RPM the fast the fast the data will be accessed.

<http://www.howstuffworks.com/hard-disk.htm>

In a hard drive explain the function of the following components

a. Spindle- Is the shaft that hold the hard disk drives in place and prevents it from flying away or moving

b. Actuator arm- Known as read/write, as the head moves the actuator arm reads/ writes the heads to facilitate to read, write or delete the information.

c. Read/write head- Read/write heads are used to read and write data from the hard drive.

d. Platter- Platter is the disk that is coated with magnetic media, and it's located within a hard drive to permanently store your data.

e. Actuator- Actuator is an electronic device controlled by a motor that moves the hard

drive head arm. In the past, the actuator within a hard drive was controlled by a stepper motor. However, today the actuator is often controlled by a servo motor

<http://www.computerhope.com/jargon/h/harddriv.htm>